## THAT WHICH IS CLAIMED IS:

## 1. A compound of Formula I:

$$R_{13}N \downarrow L \qquad X \qquad A \qquad X$$

$$R_{14}-N \qquad R_{2}-N \qquad R_{3}$$

$$R_{2}-N \qquad R_{4}$$

$$R_{4}$$

wherein:

X is selected from the group consisting of O, S, and NH;

Y is CH or N;

A is CH or N;

B is selected from the group consisting of NH, O or S;

 $R_{\rm l}$  is selected from the group consisting of H, loweralkyl, halogen, oxyalkyl, oxyaryl, and oxyarylakyl;

 $R_2$  and  $R_9$  are each independently selected from the group consisting of H,  $H_2$ , hydroxy, lower alkyl, cycloalkyl, aryl, alkylaryl, alkoxyalkyl, hydroxycycloalkyl, alkoxycycloalkoxy, hydroxyalkyl, aminoalkyl and alkylaminoalkyl; and

 $R_3$ ,  $R_4$ ,  $R_{13}$  and  $R_{14}$  are each independently selected from the group consisting of H, lower alkyl, alkoxyalkyl, cycloalkyl, aryl, alkylaryl, hydroxyalkyl, aminoalkyl, and alkylaminoalkyl, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together represent a  $C_2$  to  $C_{10}$  alkyl, hydroxyalkyl, or alkylene, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together are:

wherein n is a number from 1 to 3, and  $R_{10}$  is H or -CONH $R_{11}$ N $R_{15}$ R $_{16}$ , wherein  $R_{11}$  is lower alkyl and  $R_{15}$  and  $R_{16}$  are each independently selected from the group consisting of H and lower alkyl;

$$R_{5}$$
 $R_{6}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{9}$ 
 $R_{1}$ 
 $R_{1}$ 
 $R_{2}$ 
 $R_{3}$ 
 $R_{4}$ 
 $R_{5}$ 
 $R_{5}$ 
 $R_{6}$ 
 $R_{5}$ 
 $R_{6}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{9}$ 
 $R_{1}$ 
 $R_{1}$ 
 $R_{2}$ 
 $R_{3}$ 
 $R_{4}$ 
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 $R_{6}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{9}$ 
 $R_{1}$ 
 $R_{1}$ 
 $R_{2}$ 
 $R_{3}$ 
 $R_{4}$ 
 $R_{5}$ 
 $R_{5}$ 
 $R_{5}$ 
 $R_{5}$ 
 $R_{6}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 

wherein R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub> are each individually selected from the group consisting of H, alkyl, halo, aryl, arylalkyl, aminoalkyl, aminoaryl, oxoalkyl, oxoaryl, and oxoarylalkyl; and wherein said compound of Formula I binds the minor groove of DNA as a dimer.

## 2. The compound of Formula I, wherein L is:

$$R_5$$
 $R_6$ 
 $R_7$ 

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

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The compound of Formula I, wherein L is: 3.

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_{7}$ ,  $R_{8}$ ,  $R_{9}$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

A method of binding mixed sequence DNA comprising contacting a 4. sample DNA with a compound of Formula (I):

$$R_{13}N \xrightarrow{R_1} L \xrightarrow{X} X \xrightarrow{B} R_{2}-N R_{3}$$

$$R_{14}-N \xrightarrow{R_{9}} R_{9} \xrightarrow{R_{2}-N} R_{4}$$

$$R_{14}-N \xrightarrow{R_{14}} R_{14}$$

wherein:

X is selected from the group consisting of O, S, and NH;

Y is CH or N;

A is CH or N;

B is selected from the group consisting of NH, O or S;

R<sub>1</sub> is selected from the group consisting of H, loweralkyl, halogen, oxyalkyl, oxyaryl, and oxyarylakyl;

 $R_2$  and  $R_9$  are each independently selected from the group consisting of H,  $H_2$ , hydroxy, lower alkyl, cycloalkyl, aryl, alkylaryl, alkoxyalkyl, hydroxycycloalkyl, alkoxycycloalkoxy, hydroxyalkyl, aminoalkyl and alkylaminoalkyl; and

 $R_3,\,R_4,\,R_{13}$  and  $R_{14}$  are each independently selected from the group consisting of H, lower alkyl, alkoxyalkyl, cycloalkyl, aryl, alkylaryl, hydroxyalkyl, aminoalkyl, and alkylaminoalkyl, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together represent a  $C_2$  to  $C_{10}$ alkyl, hydroxyalkyl, or alkylene, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together are:

wherein n is a number from 1 to 3, and  $R_{10}$  is H or -CONHR<sub>11</sub>NR<sub>15</sub>R<sub>16</sub>, wherein  $R_{11}$  is lower alkyl and  $R_{15}$  and  $R_{16}$  are each independently selected from the group consisting of H and lower alkyl;

$$R_{1}$$
 $R_{2}$ 
 $R_{3}$ 
 $R_{4}$ 
 $R_{7}$ 
 $R_{5}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{8}$ 
 $R_{9}$ 
 $R_{1}$ 
 $R_{1}$ 
 $R_{2}$ 
 $R_{3}$ 
 $R_{4}$ 
 $R_{5}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 

wherein R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub> are each individually selected from the group consisting of H, alkyl, halo, aryl, arylalkyl, aminoalkyl, aminoaryl, oxoalkyl, oxoaryl, and oxoarylalkyl; wherein said compound of Formula I binds the minor groove of DNA as a dimer.

5. The method of Claim 4 wherein L is:

$$R_5$$
  $R_6$   $R_7$ 

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

6. The method of Claim 4, wherein L is:

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

7. A method of detecting mixed sequence DNA comprising contacting a sample of DNA with a fluorescent compound of Formula (I):

$$\begin{array}{c|c}
R_{13}N & Y & A \\
R_{14}-N & B & R_{2}-N \\
R_{9} & R_{4}
\end{array}$$
(I)

wherein:

X is selected from the group consisting of O, S, and NH;

Y is CH or N;

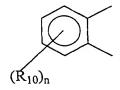
A is CH or N;

B is selected from the group consisting of NH, O or S;

R<sub>1</sub> is selected from the group consisting of H, loweralkyl, halogen, oxyalkyl, oxyaryl, and oxyarylakyl;

R<sub>2</sub> and R<sub>9</sub> are each independently selected from the group consisting of H, H<sub>2</sub>, hydroxy, lower alkyl, cycloalkyl, aryl, alkylaryl, alkoxyalkyl, hydroxycycloalkyl, alkoxycycloalkoxy, hydroxyalkyl, aminoalkyl and alkylaminoalkyl; and

 $R_3$ ,  $R_4$ ,  $R_{13}$  and  $R_{14}$  are each independently selected from the group consisting of H, lower alkyl, alkoxyalkyl, cycloalkyl, aryl, alkylaryl, hydroxyalkyl, aminoalkyl, and alkylaminoalkyl, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together represent a  $C_2$  to  $C_{10}$  alkyl, hydroxyalkyl, or alkylene, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together are:



wherein n is a number from 1 to 3, and  $R_{10}$  is H or -CONHR<sub>11</sub>NR<sub>15</sub>R<sub>16</sub>, wherein  $R_{11}$  is lower alkyl and  $R_{15}$  and  $R_{16}$  are each independently selected from the group consisting of H and lower alkyl;

$$R_{5}$$
 $R_{6}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{8}$ 

wherein R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub> are each individually selected from the group consisting of H, alkyl, halo, aryl, arylalkyl, aminoalkyl, aminoaryl, oxoalkyl, oxoaryl, and oxoarylalkyl; and wherein said compound of Formula I binds the minor groove of DNA as a dimer;

and then observing fluorescence in the sample, the observation of fluorescence indicating the compound of Formula I has bound to a sequence of DNA.

## 8. The method of Claim 7, wherein L is:

$$R_5$$
 $R_7$ 

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

9. The method of Claim 7, wherein L is:

$$R_5$$
 $R_7$ 
 $R_7$ 

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

10. A pharmaceutical formulation comprising a compound of Formula I:

$$R_{13}N \downarrow L \qquad X \qquad A \qquad X$$

$$R_{14}-N \downarrow R_{9} \qquad R_{2}-N \downarrow R_{4}$$

$$R_{14}-N \downarrow R_{14}$$

$$R_{14}-N \downarrow R_{14}$$

$$R_{14}-N \downarrow R_{14}$$

$$R_{14}-N \downarrow R_{14}$$

$$R_{15}-N \downarrow R_{15}$$

$$R_{15}-N \downarrow R_{15}$$

$$R_{15}-N \downarrow R_{15}$$

wherein:

X is selected from the group consisting of O, S, and NH;

Y is CH or N;

A is CH or N;

B is selected from the group consisting of NH, O or S;

R<sub>1</sub> is selected from the group consisting of H, loweralkyl, halogen, oxyalkyl, oxyaryl, and oxyarylakyl;

R<sub>2</sub> and R<sub>9</sub> are each independently selected from the group consisting of H, H<sub>2</sub>, hydroxy, lower alkyl, cycloalkyl, aryl, alkylaryl, alkoxyalkyl, hydroxycycloalkyl, alkoxycycloalkoxy, hydroxyalkyl, aminoalkyl and alkylaminoalkyl; and

 $R_3$ ,  $R_4$ ,  $R_{13}$  and  $R_{14}$  are each independently selected from the group consisting of H, lower alkyl, alkoxyalkyl, cycloalkyl, aryl, alkylaryl, hydroxyalkyl, aminoalkyl, and alkylaminoalkyl, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together represent a  $C_2$  to  $C_{10}$  alkyl, hydroxyalkyl, or alkylene, or  $R_3$  and  $R_4$  together or  $R_{13}$  and  $R_{14}$  together are:

wherein n is a number from 1 to 3, and  $R_{10}$  is H or -CONHR<sub>11</sub>NR<sub>15</sub>R<sub>16</sub>, wherein  $R_{11}$  is lower alkyl and  $R_{15}$  and  $R_{16}$  are each independently selected from the group consisting of H and lower alkyl;

$$R_{5}$$
 $R_{6}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{7}$ 
 $R_{8}$ 
 $R_{9}$ 
 $R_{9$ 

wherein R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, and R<sub>8</sub> are each individually selected from the group consisting of H, alkyl, halo, aryl, arylalkyl, aminoalkyl, aminoaryl, oxoalkyl, oxoaryl, and oxoarylalkyl;

in a pharmaceutically acceptable carrier.

11. The pharmaceutical formulation of Claim 10, wherein L is:

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .

12. The pharmaceutical formulation of Claim 10, wherein L is:

A is N, B is NH, X is O, Y is CH,  $R_1$ ,  $R_2$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{14}$  are each H, and  $R_3$  and  $R_{13}$  are each  $H_2$ .